DISTORTION TOLERANT LINEAR PHASE MODULATIONS

ABSTRACT

A signal and information transmission system for communications or radar and a method of achieving distortionless transmission of linear phase shift keying signals amplified by nonlinear power amplifiers or distorted by up-converters and RF circuits or the channel. Error correcting codes are used to jointly overcome both the distortion by the power amplifiers or up-converters and RF circuits or the channel and the noise. The modulator generates properly pulse shaped PSK signal, which does not have constant envelope. The signal-to-distortion power ratio is maximized to be above 20 dB at the fully saturated power amplifier output. The simplest linear receiver is provided to demodulate the received signal in the presence of radio distortion, channel distortion and noise. The decoder makes decision in the presence of radio distortion, channel distortion and noise. The method guarantees distortionless transmission of PSK signals for communications systems or radar employing power amplifiers of high DC-to-AC power conversion efficiency including class-F, class-E, class-D, class-C, or any of class-A, class-B, class-AB working in the saturation region. The method can achieve high bandwidth efficiency.